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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

025455-093

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)

09/830403

INTERNATIONAL APPLICATION NO.

PCT/IB99/01784

INTERNATIONAL FILING DATE

08/11/99 08 NOVEMBER 1999

PRIORITY DATE CLAIMED

09/11/98 09 NOVEMBER 1998

TITLE OF INVENTION

COMPACTION ROLLER

APPLICANT(S) FOR DO/EO/US

1) Eric Johnston COOK, 2) Christoffel Avril MIJBURGH

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and the PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
 - ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

PUBLICATION WO 00/28155

27 APR 2001

U.S. APPLICATION NO. (if known/ see 37 CFR 1.501)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
097830403	PCT/IB99/01784	025455-093

17. <input checked="" type="checkbox"/> The following fees are submitted:		CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):			
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1,000.00 (960)			
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 (970)			
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 (958)			
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 (956)			
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 (962)			
ENTER APPROPRIATE BASIC FEE AMOUNT =		\$ 860.00	
Surcharge of \$130.00 (154) for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492(e)).		\$ ---	
20 <input type="checkbox"/> 30 <input type="checkbox"/>			
Claims	Number Filed	Number Extra	Rate
Total Claims	16 -20 =	---	X\$18.00 (966)
Independent Claims	2 -3 =	---	X\$80.00 (964)
Multiple dependent claim(s) (if applicable)		+ \$270.00 (968)	\$ ---
TOTAL OF ABOVE CALCULATIONS =		\$ 860.00	
Reduction for 1/2 for filing by small entity, if applicable (see below).		\$ 430.00	-
SUBTOTAL =		\$ 430.00	
Processing fee of \$130.00 (156) for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492(f)).		\$ ---	
20 <input type="checkbox"/> 30 <input type="checkbox"/>			
TOTAL NATIONAL FEE =		\$ 430.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 (581) per property +		\$ ---	
TOTAL FEES ENCLOSED =		\$ 430.00	
		Amount to be: refunded \$	
		charged \$	

- a. ☒ Small entity status is hereby claimed.
- b. ☒ A check in the amount of \$ 430.00 to cover the above fees is enclosed.
- c. ☐ Please charge my Deposit Account No. 02-4800 in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- d. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4800. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Alan E. Kopecki, Esq.
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

SIGNATURE

Alan E. Kopecki

NAME

25,813

REGISTRATION NUMBER

Applicant or Patentee: COMPACTION TECHNOLOGY (SOIL) LIMITED Attorney's
Serial or Patent No.: _____ Docket No.: _____
Filed or Issued: 27 APRIL 2001
For: "COMPACTION ROLLER"

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9 (f) and 1.27 (c)) — SMALL BUSINESS CONCERN

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN COMPACTION TECHNOLOGY (SOIL) LIMITED
ADDRESS OF CONCERN C/O SYDNEY DE LEON OF TALBOT HOUSE, 204-226 IMPERIAL DRIVE,
HARROW, MIDDLESEX HA2 7HH, UNITED KINGDOM

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9 (d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled _____

COMPACTION ROLLER by inventor(s)
COOK, ERIC JOHNSTONE; MILBURGH, CHRISTOFFEL AVRIL described in

☐ the specification filed herewith

☒ application serial no. _____, filed 27 APRIL 2001

☐ patent no. _____, issued _____

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

NAME _____
ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

NAME _____
ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING SYDNEY DE LEON **SHARLESBURY REGISTRARS LIMITED**
TITLE OF PERSON OTHER THAN OWNER AUTHORISED SIGNATORY
ADDRESS OF PERSON SIGNING C/O SYDNEY DE LEON OF TALBOT HOUSE, 204-226 IMPERIAL
DRIVE, HARROW, MIDDLESEX HA2 7HH, UNITED KINGDOM

SIGNATURE  DATE 1-05-01

09/830403

CCOS Rec'd PCT/PTO 27 APR 2001

Patent
Attorney's Docket No. 025455-093

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of)	
Erik Johnstone COOK et al.)	BOX PCT/US
Application No. [Not Assigned])	
International Application PCT/IB99/01784)	
I.A. Date: November 8, 1999)	
For: COMPACTION ROLLER)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the subject application as follows.

IN THE CLAIMS

Amend claims 3, 5, 6, 7 and 10 as follows:

3. (Amended) A soil compaction roller according to claim 1 wherein the salient points are equi-angularly spaced about a central axis of the roller and are equidistant from that axis.

5. (Amended) A soil compaction roller according to claim 1 wherein each compacting face is smoothly curved.

6. (Amended) A soil compaction roller according to claim 1 wherein each compacting face comprises a plurality of flat facets which in combination form an outwardly convex shape.

7. (Amended) A soil compaction roller according to claim 1 comprising a first series of wear plates defining the salient points and a second series of wear plates defining the compaction faces.

10. (Amended) A soil compaction machine comprising a soil compaction roller according to claim 1.

REMARKS

The present amendment is requested to delete reference to the multiple dependencies in the original claims for calculation of the U.S. filing fee(s).

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: 

Alan E. Kopecki
Registration No. 25,813

P.O. Box 1404
Alexandria, Virginia 22313-1404
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Date: April 27, 2001

Attachment to Amendment dated April 27, 2001
Marked Copy: Claims 3, 5, 6, 7 and 10 [As Amended]

3. (Amended) A soil compaction roller according to [either one of the preceding claims] claim 1 wherein the salient points are equi-angularly spaced about a central axis of the roller and are equidistant from that axis.

5. (Amended) A soil compaction roller according to [any one of the preceding claims] claim 1 wherein each compacting face is smoothly curved.

6. (Amended) A soil compaction roller according to [any one of claims 1 to 4] claim 1 wherein each compacting face comprises a plurality of flat facets which in combination form an outwardly convex shape.

7. (Amended) A soil compaction roller according to [any one of the preceding claims] claim 1 comprising a first series of wear plates defining the salient points and a second series of wear plates defining the compaction faces.

10. (Amended) A soil compaction machine comprising a soil compaction roller according to [any one of the preceding claims] claim 1.

2/PRTS

COMPACTION ROLLER

BACKGROUND TO THE INVENTION

THIS invention relates to a compaction roller.

Traditionally, soil compaction has been carried out either by means of round rollers with considerable mass or vibratory rollers. In relatively recent times, impact compaction as described in, for instance, the specification of United States patent US 2,909,106, has been used in soil compaction activities. Impact compactors have been demonstrated to achieve high levels of soil compaction at some depth below the surface but in some cases they may not be really effective for compaction of layer works where a relatively shallow surface zone of the soil mass has to be compacted. Depending on the soil conditions the impact roller of an impact compactors may have a tendency merely to disturb the surface layer rather than compact it effectively.

The impact roller of a conventional impact compactor may also have a tendency to create localised depressions in the soil surface, requiring subsequent treading operations them. They may also generate shock loads both on the towing tractor and on the soil mass and can have a relatively low operating speed.

SUMMARY OF THE INVENTION

According to the invention there is provided a soil compaction roller comprising a multi-sided, out-of-round, peripheral compacting surface which can roll over a soil surface which is to be compacted, the compacting surface being defined by a plurality of angularly spaced salient points and a corresponding plurality of compacting faces, each compacting face being outwardly convex in shape and extending continuously between two adjacent salient points.

Further according to the invention there is provided a soil compaction roller comprising a multi-sided, out-of-round, peripheral compacting surface which can roll over a soil surface which is to be compacted and which is defined by a plurality of angularly spaced salient points and intermediate compacting faces which are outwardly convex in shape and extend between the salient points, whereby when the roller is operative with the compacting surface rolling over the soil surface, the roller rises up on each salient point in turn, storing potential energy, and thereafter rolls downwardly onto the succeeding compacting face to transmit the stored potential energy to the soil surface to compact it, the instantaneous centre of rotation of the compacting surface, where it contacts the soil surface during rolling, moving continuously about substantially the full extent of the compacting surface.

The geometry of the roller is preferably such that the salient points are equi-angularly spaced about a central axis of the roller and are equidistant from that axis, and each compacting face is symmetrical about a radial bisector of the two salient points between which the compacting face extends. The compacting face may be smoothly curved or composed of a plurality of flat facets which in combination form an outwardly convex shape.

Another aspect of the invention provides a soil compaction machine comprising a soil compaction roller as summarised above. The machine may have a pair of the rollers arranged side by side with one another.

In the dual roller configuration there are various possibilities. For instance, the soil compaction rollers may be mounted on a common axle in the manner described for impact compaction rollers in ZA80/2099 (=EP 0 017 511). Alternatively the rollers may be suspended independently on separate axles as described for impact compaction rollers in PCT/IB99/00906. The machine may be self-propelled as described for an impact compaction machine in PCT/GB96/01708 (WO 97/04179), or it may include coupling means for coupling it to a tractive vehicle such as a tractor. The machine may also incorporate an auxiliary drive arrangement for delivering an auxiliary rotary driving force to the rollers as described for a dual roller impact compaction machine in PCT/GB98/01400 (WO 98/51866).

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:

- Figure 1** shows a perspective view of a compaction roller according to this invention;
- Figure 2** shows a side view of the compaction roller;
- Figure 3** shows an end view of the compaction roller;
- Figure 4** shows a cross-section at the line A-A in Figure 2; and

Figure 5 shows a soil compaction machine incorporating two compaction rollers, according to the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

The illustrated multi-sided compaction roller 10 has a central hub 12 located on a central axis 14 and a peripheral compacting surface 16 which is joined to the hub by radial spokes 18. The compacting surface 16 is defined by six salient points 20 which are equi-angularly spaced apart and equidistant from the central axis 14, and six intermediate compacting faces 22 extending between the salient points. The compacting faces 22 are identical to one another and each has a smooth, convex curvature which is symmetrical about a radial bisector of the two salient points 20 between which it extends. For example, the compacting face 22.1 is symmetrical about the radial bisector 24 of the two salient points 20.1.

The salient points 20 and faces 22 of the compaction surface 16 are formed by curved wear plates 26 and 28 respectively which are mounted to the ends of the spokes 18. The assembly of plates 26 and 28 is stiffened by ribs 30 which are located at the lateral edges of the plates and which are connected to the plates and to the lateral extremities of the spokes 18.

In operation of the compaction roller 10, the hub 12 is mounted on an axle supported by a carriage which is towed by a suitable towing vehicle, such as a tractor (not shown). In practice, there may be two similar compaction rollers arranged side by side. In this case the compaction rollers may be mounted on a common axle or they may be independently suspended.

The specification of South African patent ZA 80/2099 (= EP 0 017 511) describes an apparatus in which two impact compaction rollers are mounted side by side on a common axle. A similar mounting arrangement may be used to mount compaction rollers 10 on a common axle.

PCT/IB99/00906 describes an apparatus in which two impact compaction rollers are suspended independently in a side by side configuration and, once again, a similar mounting arrangement can be used for dual compaction rollers 10, as shown in Figure 5.

It is also within the scope of the invention for there to be a single compaction roller 10 only, in which case the roller may be mounted in the manner described in the specification of United States patent US 2,909,106.

It is also within the scope of the invention for the compaction roller(s) 10 to form part of a self-propelled machine which may, for instance, be of the type described in the specification of PCT/GB96/01708 (WO 97/04179).

EP 0 017 511, PCT/IB99/00906, US 2,909,106 and WO 97/04179 describe impact compaction machines in which each compactor mass, as it rolls over a soil surface which is to be compacted, alternately rises up on a salient point, storing potential energy, and then falls forwardly and downwardly for the stored potential energy to be delivered to the soil surface as an impact blow by a compaction face which follows the salient point. As mentioned previously, while this compaction technique has been proved to be effective to produce high levels of soil compaction at considerable depths below the soil surface, they have several disadvantages at least in some applications.

The compaction roller 10 does not act in the manner of an impact compaction roller. As it rolls over the soil surface, it rises up on each salient point 20 and then rolls forwardly and downwardly onto the succeeding compacting face 22. Potential energy which is stored as the roller rises on a salient point is applied to the soil surface as the roller rolls onto the succeeding face 22, but this happens in a far smoother manner than is the case with an impact compaction roller. This is attributable *inter alia* to the convex shape of the sides 22 which allows for a smooth transition from each raised, potential energy storage position to a succession of relatively lowered positions as the convex surface of the following face 22 rolls over the soil surface. The instantaneous centre of rotation, i.e. the point at which the compacting surface 16 makes line contact with the soil surface and about which the roller rotates instantaneously relative to the soil surface, moves continuously about substantially the full extent of the surface 16.

The action of the roller 10 may be likened to a continuous kneading action as opposed to the periodic impact action of an impact compaction roller.

The effect of this is that the soil surface experiences compacting pressure throughout the full rotation of the roller 10, i.e. at all angular positions of the roller. As the roller rises onto a salient point 22, the compacting pressure is experienced as a result of the reaction force applied to the soil surface by the roller, and as the roller subsequently rolls forwardly and downwardly onto a compacting face 22, the compacting force is experienced as a result of the stored potential energy being transmitted to the soil surface.

This action is in contrast to the action of an impact compaction roller. In the case of impact compaction rollers having flat sides, the only centres of rotation are at the salient points or corners of the roller.

There is no continuous movement of an instantaneous centre of rotation about the peripheral compacting surface of the roller. In the case of impact compaction rollers having a re-entrant recess between each salient point and the subsequent compacting face, the centre of rotation jumps from the salient point to an angularly spaced point on the compacting face. Hence there is once again no continuous, smooth motion of an instantaneous centre of rotation about the full extent of the peripheral compacting surface.

In contrast to the smooth and continuous application of compacting pressure to the soil surface with the roller 10, both types of impact roller mentioned above apply abrupt, non-continuous pressure spikes to the soil surface, resulting in disturbance of the soil mass adjacent the soil surface but often little effective compaction of that mass.

Because of its ability to apply smooth and continuous pressure to the soil surface, a roller 10, on the other hand, has been demonstrated in initial tests to have the ability to achieve effective compaction right to the surface of a soil mass. This makes the roller 10 eminently suitable for use in compacting layer-works.

Added to this, the smooth application of compacting pressure with the roller 10 results in a relatively smooth, compacted soil surface. This is again in contrast to the operation of an impact compaction roller, where localised indentations are created in the soil surface which must subsequently be smoothed, typically by blading.

With the illustrated roller 10 adequate levels of soil compaction can also be achieved without the substantial shock loads experienced in the operation of an impact compaction roller. This can in turn lead to reduced wear on the compactor itself and on surrounding equipment and structures.

A further advantage of the illustrated roller 10, when compared for instance to impact compaction rollers as seen in the specification of ZA 96/6036, arises from the symmetrical shapes of the sides 22 which allow the roller to be bi-directional, i.e. it can be rotated in either direction over the soil surface, and typically at higher rotational speeds than an impact roller, with comparable results. This is particularly important in cases where rollers 10 are used in a reversible, self-propelled machine.

In the preferred roller 10 the compacting faces are smoothly and convexly curved, but it is within the scope of the invention for these faces to be made up of a large number of narrow, flat facets defining, in combination, a generally convex surface.

PCT/GB98/01400 (WO 98/51866) describes an impact compaction machine which incorporates an auxiliary drive arrangement to apply an auxiliary rotary drive to the impact compactor masses or rollers of the machine. This may be necessary when, for instance, the salient points of the rollers have a tendency to dig into or slide on the soil surface. The auxiliary drive arrangement operates to restore the angular velocity of the rollers for normal operation to continue. It is also within the scope of the present invention for an auxiliary drive arrangement, similar to that described in WO 98/51866, to be incorporated in the compaction machine.

Various other modifications are also within the scope of the invention. For instance, while reference has been made to substantially continuous application of pressure to the soil surface and substantially continuous movement of the instantaneous centre of rotation about the full extent of the compacting surface, minor localised deformations, for instance recesses, in the compacting surface, can be tolerated while still achieving desirable levels of surface compaction.

CLAIMS

1.

A soil compaction roller comprising a multi-sided, out-of-round, peripheral compacting surface which can roll over a soil surface which is to be compacted, the compacting surface being defined by a plurality of angularly spaced salient points and a corresponding plurality of compacting faces, each compacting face being outwardly convex in shape and extending continuously between two adjacent salient points.

2.

A soil compaction roller comprising a multi-sided, out-of-round, peripheral compacting surface which can roll over a soil surface which is to be compacted and which is defined by a plurality of angularly spaced salient points and intermediate compacting faces which are outwardly convex in shape and extend between the salient points, whereby when the roller is operative with the compacting surface rolling over the soil surface, the roller rises up on each salient point in turn, storing potential energy, and thereafter rolls downwardly onto the succeeding compacting face to transmit the stored potential energy to the soil surface to compact it, the instantaneous centre of rotation of the compacting surface, where it contacts the soil surface during rolling, moving continuously about substantially the full extent of the compacting surface.

3.

A soil compaction roller according to either one of the preceding claims wherein the salient points are equi-angularly spaced about a central axis of the roller and are equidistant from that axis.

4.

A soil compaction roller according to claim 3 wherein each compacting face is symmetrical about a radial bisector of the two salient points between which the compacting face extends.

5.

A soil compaction roller according to any one of the preceding claims wherein each compacting face is smoothly curved.

6.

A soil compaction roller according to any one of claims 1 to 4 wherein each compacting face comprises a plurality of flat facets which in combination form an outwardly convex shape.

7.

A soil compaction roller according to any one of the preceding claims comprising a first series of wear plates defining the salient points and a second series of wear plates defining the compaction faces.

8.

A soil compaction roller according to claim 7 comprising a central hub and a plurality of spokes connecting the wear plates of the second series to the hub.

9.

A soil compaction roller according to claim 8 comprising stiffening ribs located internally of the wear plates at the lateral edges of the wear plates, the stiffening ribs being connected to the wear plates and to the spokes.

10.

A soil compaction machine comprising a soil compaction roller according to any one of the preceding claims.

11.

A soil compaction machine according to claim 10 which comprises a pair of the soil compaction rollers arranged side by side with one another.

12.

A soil compaction machine according to claim 11 wherein the soil compaction rollers are mounted on a common axle.

13.

A soil compaction machine according to claim 11 wherein the soil compaction rollers are suspended independently on separate axles.

14.

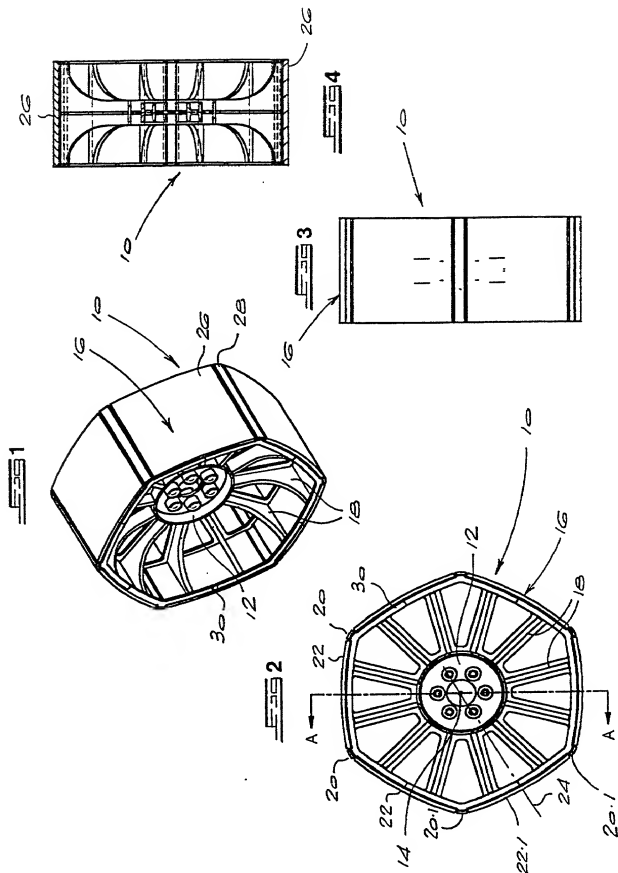
A soil compaction machine according to claim 11 which is self-propelled.

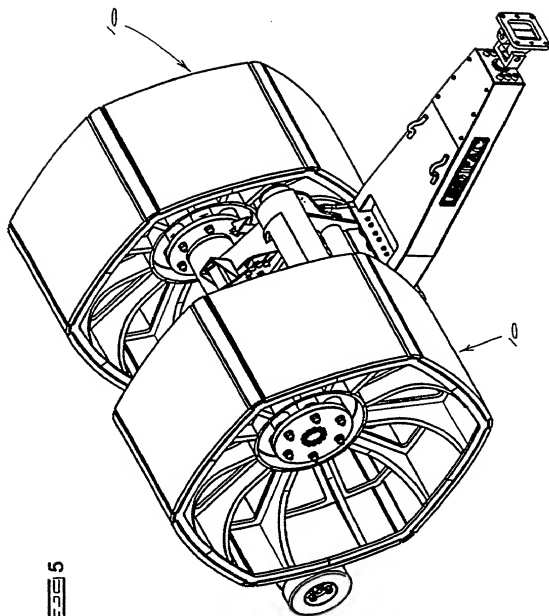
15.

A soil compaction machine according to claim 11 which includes coupling means for coupling the machine to a tractive vehicle.

16.

A soil compaction machine according to claim 11 and comprising means for delivering an auxiliary rotary driving force to each roller.





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09830403-001201

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to Provisional and PCT International Applications)

ATTORNEY'S DOCKET NUMBER

025455093

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

COMPACTION ROLLER

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Number _____

on _____

and was amended

on _____ (if applicable).

☒ was filed as PCT international application

Number PCT/IB99/01784

on 8 November 1999

and was amended under PCT Article 19

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(e) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. §119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. §119
SOUTH AFRICA	98/10205	9 NOVEMBER 1998	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

(Application Number) _____

(Filing Date) _____

(Application Number) _____

(Filing Date) _____

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONTINUED)
(Includes Reference to Provisional and PCT International Applications)

ATTORNEY'S DOCKET NO.

025458/093

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the Office all information known to me to be material to the patentability as defined in Title 37, Code of Federal Regulations §1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NO.	PCT FILING DATE	U.S. APPLICATION NOS. ASSIGNED (if any)		
PCT/IB99/01784	08/11/99	09/830,403	X	

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the Patent and Trademark Office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONTINUED) (Includes Reference to Provisional and PCT International Applications)		ATTORNEY'S DOCKET NO. Q25455/	
FULL NAME OF SOLE OR FIRST INVENTOR 100 COOK, ERIC JOHNSTONE-		SIGNATURE <i>[Signature]</i> ZAX	
RESIDENCE 57 SOMERSET STREET, FERRYVALE, 1491, NIGEL, SOUTH AFRICA		DATE 4 May 01	
POST OFFICE ADDRESS AS ABOVE		CITIZENSHIP SOUTH AFRICAN	
FULL NAME OF SECOND JOINT INVENTOR, IF ANY 200 MIJBURGH, CHRISTOFFEL AVRIL		SIGNATURE <i>[Signature]</i> ZAX	
RESIDENCE 13 FAIRBRIDGE STREET, FARRARMERE, 1501, BENONI, SOUTH AFRICA		DATE 30/4/01	
POST OFFICE ADDRESS AS ABOVE		CITIZENSHIP SOUTH AFRICAN	
FULL NAME OF THIRD JOINT INVENTOR, IF ANY		SIGNATURE	
RESIDENCE		DATE	
POST OFFICE ADDRESS		CITIZENSHIP	
FULL NAME OF FOURTH JOINT INVENTOR, IF ANY		SIGNATURE	
RESIDENCE		DATE	
POST OFFICE ADDRESS		CITIZENSHIP	
FULL NAME OF FIFTH JOINT INVENTOR, IF ANY		SIGNATURE	
RESIDENCE		DATE	
POST OFFICE ADDRESS		CITIZENSHIP	
FULL NAME OF SIXTH JOINT INVENTOR, IF ANY		SIGNATURE	
RESIDENCE		DATE	
POST OFFICE ADDRESS		CITIZENSHIP	
FULL NAME OF SEVENTH JOINT INVENTOR, IF ANY		SIGNATURE	
RESIDENCE		DATE	
POST OFFICE ADDRESS		CITIZENSHIP	
FULL NAME OF EIGHTH JOINT INVENTOR, IF ANY		SIGNATURE	
RESIDENCE		DATE	
POST OFFICE ADDRESS		CITIZENSHIP	
FULL NAME OF NINTH JOINT INVENTOR, IF ANY		SIGNATURE	
RESIDENCE		DATE	
POST OFFICE ADDRESS		CITIZENSHIP	